

consulted, prior to performing content sharing, to validate or authorize the sharing before it occurs. Accordingly, for some reference content, such as a video recording, an image (picture) file, an audio recording, or other data, a portion of the reference content is selected **100** for analysis. In one embodiment, the selected portion is the entire
5 reference content. In another embodiment, the selected portion comprises a sub-portion of the entire reference content. For expository convenience, it is assumed herein that the reference content is a video encoding, and that all frames of the reference content have been selected.

Feature data is extracted **102** from the reference content. For expository
10 convenience, since the reference video content is broken into frames from which the feature data is extracted, the term “frame” is also used with respect to extracted feature data. As used herein, a particular frame of feature data corresponds to the frame of video content from which the feature data was extracted. In one embodiment, feature
15 extraction comprises performing edge detection within each frame of the selected portion. In another embodiment, spatial and temporal features are identified and extracted from each frame. In one embodiment, the Sarnoff Just Noticeable Difference (JND) metric is used.

Other embodiments may use other feature extraction techniques may be used. See, for example, J. Lubin, M. Brill, R. Crane: *Vision Model-Based Assessment Of*
20 *Distortion Magnitudes In Digital Video*, located on the Internet at Uniform Resource Locator (URL) <http://www-mpeg-org/MPEG/JND> (note, to prevent inadvertent
hyperlinks, periods within the preceding URL were replaced with hyphens); American National Standards Institute (ANSI) standard T1.801.03-1996: *Digital Transport of One-*

Way Video Signals - Parameters for Objective Performance Assessment; and MPEG standards regarding object recognition and extraction.

For example, in one embodiment, a portion of each frame, such as a rectangle of pixels selected from the center of each frame, is sampled from a video at a sampling rate of four frames per second (FPS) irrespective of a source frame rate, with six frames being sampled. The sample region is subdivided into blocks, e.g., 8x8, 8x16, 16x16, 64x64, etc. may be used; it will be appreciated that different block sizes may be used depending on the content. Edge detection is performed in each of the six sampled frames, and scalar values for each block determined based on the edge detection that reflect spatial activity and angular distribution of spatial activity. In one embodiment, scalar values for multiple frames are combined to form a signature value identifying the sampled content; such signatures may be compared (see FIG. 4) to match unknown content against known content.

After extracting **102** feature data from the selected **100** portion, a test **104** is performed to determine whether the last frame of the reference content has been reached and extraction is complete. If not, extraction **102** continues **106**. When extraction is complete, the extracted feature data is stored **108** in a data store, such as a database or other storage media or storage technology. It will be appreciated by one skilled in the art that instead of storing the extracted feature data, the extracted feature data may be used to generate an identifier for the reference content, e.g., by inputting the extracted feature data to a hash function, Globally Unique Identifier generator, etc.

The amount of data extracted from reference content may be arbitrarily small depending on computation requirements or processing environment or resource

limitations. For example, assuming video frames are being processed, feature data extraction may be based on very small portions of each frame. The size and number of arrays from which features are extracted may be arbitrarily limited to reduce the amount of data storage required to identify a particular reference content. In one embodiment, at most 1% of reference content is extracted and stored **108**. Similarly, temporal sampling may be based upon a different subset of the frames to reduce computation requirements and extracted data size.

After storing **108** the extracted **102** feature data for the reference content, in one embodiment, access rights are stored **110** in the data store. For example, stored access rights may be provided to a sharing application program, e.g., a program used by a user seeking to share a candidate content, so that the sharing application program may provide sharing options to the user. Access rights may be used to restrict or grant sharing rights based on various criteria, including demographic profile data or other characteristics of the user. It will be appreciated that access rights may be stored and/or determined separately from the storing of extracted feature data.

After storing **110** access rights, in one embodiment, purchase information for the reference content is stored **112** in the data store. For example, assuming it has been determined that a user of a sharing application program is attempting to illicitly share a candidate content in violation of the candidate content's access rights, then purchase information may be provided to an intended recipient of the candidate content and/or the sharing application program. It will be appreciated that purchase information may be stored and/or determined separately from the storing of extracted feature data.